

# INVESTIGATOR'S ANNUAL REPORT

## National Park Service

All or some of the information provided may be available to the public

<b>Reporting Year:</b> 1993	<b>Park:</b> Shenandoah NP
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<b>Additional investigators or key field assistants (first name, last name, office phone, office email):</b> No co-investigators	
<b>Permit#:</b> SHEN1993AGQB	
<b>Park-assigned Study Id. #:</b> unknown	
<b>Project Title:</b> Survey and Distribution of Hemlock Woolly Adelgid in Shenandoah National Park	
<b>Permit Start Date:</b> Jan 01, 1998	<b>Permit Expiration Date</b> Jan 01, 1998
<b>Study Start Date:</b> Jan 01, 1993	<b>Study End Date</b> Jan 01, 1993
<b>Study Status:</b> Completed	
<b>Activity Type:</b> Other	
<b>Subject/Discipline:</b> Invertebrates (Insects, Other)	
<b>Objectives:</b> 1) To determine the presence or absence of hemlock woolly adelgid (HWA) in the eastern hemlock stands of Shenandoah National Park (SHEN).;2) Assess the crown health of eastern hemlock trees in random and permanent plots in SHEN.;3) To determine rates of crown health decline and mortality of infested eastern hemlocks in SHEN.	
<b>Findings and Status:</b> Ninety-four eastern hemlock stands were identified, located, and surveyed. Over 7,300 trees in 2,016 acres were surveyed. All trees were infested and 86% of infested trees showed signs of crown health decline. Four-hundred eighty two hemlock trees in six sites and 18 plots were rated for crown health in 1990-91 at time of plot establishment, in 1992, and again in 1993. The number of trees rated healthy (#1 rating) decreased from 373 to 120 to 84 in 1990-91, 1992, and 1993 respectively. The number of trees rated fairly healthy (#2 rating) increased from 62 to 221 and decreased to 158 in 1990-91, 1992, and 1993 respectively. The number of trees rated poor increased from 10 to 92 to 154 during the sample period. The number of trees that died as a result of HWA associated stresses increased from 10 to 14 to 36 from 1990-91 to 1993. Crown health assessments were also taken in random plots throughout the Park. These samples showed that 20% of the Park's hemlock trees remain healthy looking although infested. Fifty-eight percent were rated fairly healthy, 18% were rated poor, and 3% were dead from HWA associated stresses. Crown health rates are expected to decline further and mortality is expected to increase dramatically.	
<b>For this study, were one or more specimens collected and removed from the park but not destroyed during analyses?</b> No	
<b>Funding provided this reporting year by NPS:</b> 2000	<b>Funding provided this reporting year by other sources:</b> 13000
<b>Fill out the following ONLY IF the National Park Service supported this project in this reporting year by providing money to a university or college</b>	

<b>Full name of college or university:</b>  n/a	<b>Annual funding provided by NPS to university or college this reporting year:</b>  0
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